

Patent claims

1. A circuit arrangement comprising a low-temperature
5 circuit (NK) for cooling charge air (13) that is
fed to an engine (8) in a motor vehicle equipped
with a turbocharger, characterized in that the
charge air (13) is compressed in two stages in a
10 first low-pressure turbocharger (1) and a second
high-pressure turbocharger (2), where, in order to
cool the charge air (13), a first cooler (3) is
provided downstream of the low-pressure
turbocharger (1) and upstream of the high-pressure
15 turbocharger (2), and a second cooler (4) is
provided downstream of the high-pressure
turbocharger (2) and upstream of the engine (8).
2. The circuit arrangement as claimed in claim 1,
characterized in that a low-pressure charge
20 air/coolant cooler (3) is provided for the first
cooling of the charge air (13).
3. The circuit arrangement as claimed in claim 1 or
2, characterized in that a high-pressure charge
25 air/air cooler (4) is provided for the second
cooling of the charge air (13).
4. The circuit arrangement as claimed in claim 3,
characterized in that the high-pressure charge
30 air/air cooler (4) is arranged alongside a low-
temperature cooler (5) and, seen in the direction
of air flow of the cooling air (15), upstream of a
main coolant cooler (6).
- 35 5. The circuit arrangement as claimed in claim 4,
characterized in that the front face of the low-
temperature cooler (5) takes up 20% to 50% of the
total front surface.

6. The circuit arrangement as claimed in one of claims 1 through 5, characterized in that the low-temperature circuit (NK) is independent of the engine cooling circuit (MK) and has its own pump (10) for delivering the coolant (14).
7. The circuit arrangement as claimed in claim 6, characterized in that the pump (10) in the low-temperature circuit (NK) is arranged between the low-temperature cooler (5) and the low-pressure charge air/coolant cooler (3) or between the low-pressure charge air/coolant cooler (3) and the low-temperature cooler (5).
8. The circuit arrangement as claimed in one of claims 1 through 5, characterized in that the low-temperature circuit (NK) is part of an engine cooling circuit (MK).
9. The circuit arrangement as claimed in claim 8, characterized in that the low-temperature circuit (NK) branches off from the pressure side of a pump (9) from the engine cooling circuit (MK) and is fed back to the engine cooling circuit (MK) at the engine outlet.
10. A method for operating a circuit arrangement (K) as claimed in one of the preceding claims, characterized in that the charge air (13) is cooled in at least two stages, in each case after a compression.
11. The method for operating a circuit arrangement (K) as claimed in claim 10, characterized in that the charge air (13) after the intermediate cooling in the low-pressure turbocharger (1) has a temperature of between 40°C and 110°C.